

HOW I DO IT

## Alternative Method for Exposure of the Retropancreatic Mesenteric Vasculature During Total Pancreatectomy

STEVEN D. LEACH, MD, B. SCOTT DAVIDSON, MD, FREDERICK C. AMES, MD,  
AND DOUGLAS B. EVANS, MD

*From the Department of Surgical Oncology, The University of Texas  
M. D. Anderson Cancer Center, Houston, Texas*

### INTRODUCTION

In our recent experience with total pancreatectomy, we have encountered two patients in whom initial mobilization of the distal pancreas was not technically feasible due to huge tumor masses that prevented identification of the left renal vein and adequate vascular control of the splenic vein-portal confluence. In both cases the large tumor mass precluded safe mobilization of the spleen and distal pancreas without first disconnecting the specimen from the retropancreatic mesenteric vessels. In order to accomplish this, we employed an alternative technique to separate the pancreas from the SMV and SMA, which involved medial rotation of the duodenum, pancreatic head, and uncinate process.

### TECHNIQUE

The initial steps involved in pancreatectomy are performed in a standardized fashion, as previously described [1–3]. In brief, we expose the infrapancreatic SMV by means of a Cattell-Braasch maneuver [4] followed by entry into the lesser sac. An extended Kocher maneuver is then performed to the level of the left renal vein and the left lateral wall of the aorta. Cholecystectomy, division of the common hepatic duct, and division of the gastroduodenal artery allow exposure of the underlying portal vein. Following gastric transection, the proximal jejunum is divided. The ligament of Treitz is taken down and the mesentery to the distal duodenum divided. This leaves the retropancreatic mesenteric vessels and retroperitoneal soft tissues as the only remaining attachments of the specimen.

Traditionally, dissection of the pancreas off of the superior mesenteric-portal vein confluence and SMA during total pancreatectomy is accomplished by medial rotation

of the spleen and distal pancreas. In cases where initial mobilization of the distal pancreas is not feasible, however, we have completed the retroperitoneal dissection in reverse order. This is performed by first mobilizing the portal and superior mesenteric veins above and below the pancreas, followed by identification of the SMA below the pancreas and medial to the SMV. Mobilization of the portal vein involves division of the lympho-areolar attachment between the portal vein and the superior aspect of the pancreas, as well as division of small venous tributaries. Mobilization of the superior mesenteric vein requires division of the middle colic and right gastroepiploic veins, as well as ligation of multiple venous tributaries from the inferior aspect of the uncinate process and pancreatic head. The duodenum, pancreatic head, and uncinate process are then medially retracted or rotated (Fig. 1). In contrast to dissection of the SMV and SMA during pancreaticoduodenectomy (where the pancreas is separated from the superior mesenteric-portal vein confluence prior to identification of the SMA), the SMA (rather than the SMV) is first separated from the specimen (Fig. 2A,B). The posterior aspect of the uncinate process is separated from the SMA by division of the inferior pancreaticoduodenal artery as well as other smaller branches. Perineural and lymphatic tissue between the SMA and the anteriolaterally located superior mesenteric-portal vein confluence is then divided. Further medial rotation of the specimen allows complete exposure of the retropancreatic

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Address reprint requests to Steven D. Leach, M.D., who is now at the Department of Surgery, Section of Surgical Oncology, T2104, Medical Center North, Vanderbilt University Medical Center, Nashville, TN 37232.

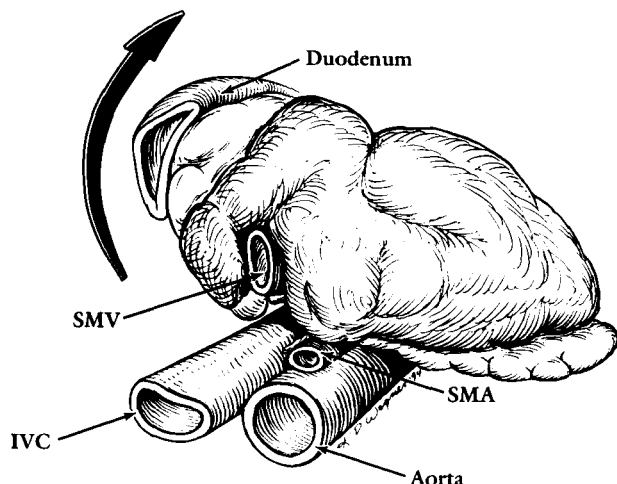


Fig. 1. Illustration of the alternative approach to exposure of the retropancreatic mesenteric vasculature during pancreatic resection. Following identification of the superior mesenteric artery (SMA) and superior mesenteric vein (SMV) inferior to the pancreas, the specimen is rotated medially and dissected free of the SMA. Additional rotation allows separation of the tumor from the superior mesenteric-portal vein confluence in a right-to-left direction, prior to mobilization of the distal pancreas. IVC, inferior vena cava.

superior mesenteric-portal vein confluence; disconnection of the specimen from this vessel is performed by careful division of small communicating veins. The medial rotation of the specimen is completed by dividing the loose areolar tissue between the neck of the pancreas and the anterior surface of the SMV. To complete the total pancreatectomy, the splenic artery and vein are divided, and the body of the pancreas is mobilized out of the retroperitoneum in a right-to-left manner. Once the central retroperitoneal vasculature has been cleared, the spleen and distal pancreas can be safely elevated to complete the resection.

### CLINICAL EXPERIENCE

To date, we have employed this alternative method in two patients undergoing total pancreatectomy. The first patient presented with a massive serous cystadenoma replacing the entire pancreas and invading the distal stomach and transverse colon (Figs. 3, 4). During the course of total pancreatectomy with en bloc gastrectomy and transverse colectomy, initial mobilization of the spleen and distal pancreas proved hazardous due to extensive retroperitoneal fibrosis, making identification of the left renal vein impossible. We therefore chose to approach the left upper quadrant dissection from a medial direction following complete right-sided tumor mobilization. As described above, the pancreatic head and uncinate process were separated first from the SMA and then from the superior mesenteric-portal vein confluence (Fig. 2B).

A second patient presented with upper gastrointes-

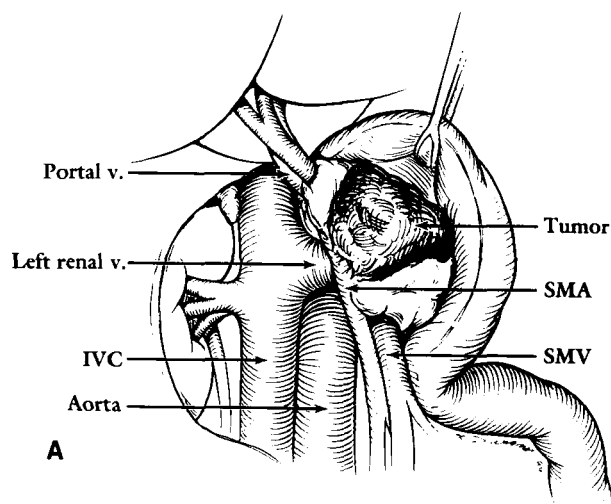


Fig. 2. Illustration (A) and intraoperative photography (B) following separation and medial rotation of the duodenum and pancreatic head from the superior mesenteric artery (SMA). The SMA is the first major vessel encountered during this maneuver. IVC, inferior vena cava; SMV, superior mesenteric vein. In B, the forceps identify the SMA, and the arrows outline the superior mesenteric-portal vein confluence; P, pancreas.

tinal hemorrhage related to a large, nonfunctioning islet cell carcinoma. Tumor bulk again precluded safe mobilization of the distal pancreas in the standard lateral-to-medial fashion. In this patient, the duodenum, pancreatic head, and uncinate process were rotated medially and the specimen disconnected from the superior mesenteric artery. Tumor invasion of the SMV required segmental venous resection; venous reconstruction was completed using an autologous internal jugular vein interposition graft prior to completion of the total pancreatectomy [3,5].

The technique described in this report represents a useful maneuver when initial mobilization of the spleen and distal pancreas is not feasible without first identifying and disconnecting the pancreatic head from the SMA and SMV. In addition, this technique may also be applied

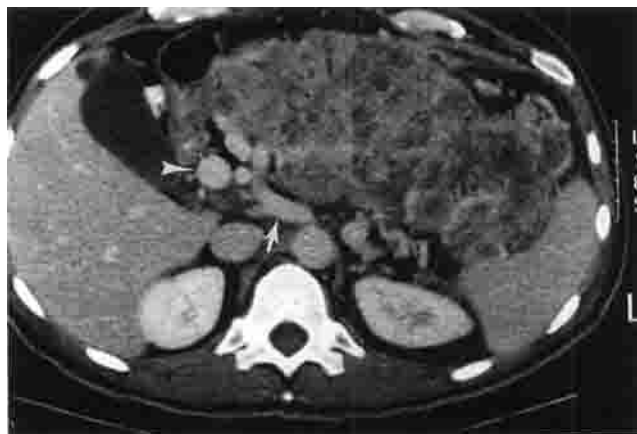


Fig. 3. Computerized tomography scan performed at the level of the celiac axis (arrow) demonstrating a massive serous cystadenoma replacing the entire pancreas. Tumor bulk in left upper quadrant precluded traditional exposure of the retropancreatic mesenteric vasculature by rightward mobilization of the spleen and distal pancreas. Arrowhead identifies the portal vein.

to patients undergoing pancreatoduodenectomy when segmental venous resection is required [6].

#### ACKNOWLEDGMENT

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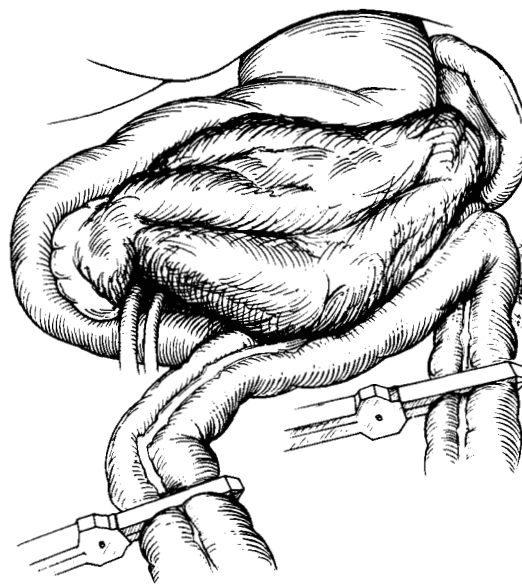


Fig. 4. Illustration of the large serous cystadenoma of the pancreas; resection required en bloc cluster resection of the pancreas, stomach, duodenum, colon, and extrahepatic biliary tree.

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